

Claims: I claim:

1. A solid-chemical composition which provides both a sustained-release source of active oxygen and a source of complex inorganic phosphates, comprising:
- A first component being a solid-chemical source of active oxygen from about 20% to 99% by weight of the composition;
 - A second component being a source of complex inorganic phosphates from about 1% to 80% by weight of the composition.
2. The solid-chemical composition of Claim 1, whereby said solid-chemical source of active oxygen is further selected from one or more of the group consisting of calcium peroxide and magnesium peroxide and any combinations thereof.
3. The solid-chemical composition of Claim 1, whereby said complex inorganic phosphates are further selected from one or more of the group consisting of ringed metaphosphates and linear polyphosphates and any combinations thereof.
4. The solid-chemical composition of Claim 1, whereby said complex inorganic phosphates are further selected from the group consisting of sodium hexametaphosphate, sodium trimetaphosphate, sodium tripolyphosphate, sodium-potassium tripolyphosphate, tetrasodium polyphosphate and any combinations thereof.
5. The solid-chemical composition of Claim 1, further comprising a source of inorganic nitrogen from about 0.1% to 10% by weight of the composition.
6. The solid-chemical composition of Claim 5, whereby said source of inorganic nitrogen is ammonium free and selected from one or more of the group consisting of sodium nitrate, sodium-potassium nitrate, potassium nitrate, other soluble salts of nitrate and any combinations thereof.
7. The solid-chemical composition of Claim 1, further comprising a source of simple inorganic orthophosphates from about 0.1% to 35% by weight of said composition.

8. The solid-chemical composition of Claim 7, whereby said simple inorganic orthophosphates are selected from one or more of the group consisting of sodium phosphate, calcium phosphate, potassium phosphate, sodium-potassium phosphate, and any combinations thereof.
9. The solid-chemical composition of Claim 1, further comprising a source of organic disintegrants from about 0.01% to 5% by weight of said composition.
10. The solid-chemical composition of Claim 9, whereby said organic disintegrants are selected from one or more of the group consisting of pre-gelled starch, powdered molasses, granulated sugar, sodium starch glycolate, crosscarmellose of sodium, crospovidone, and any combinations thereof.
11. The solid-chemical composition of Claim 1, which further includes a source of inorganic disintegrants from about 0.05% to 10% by weight of composition.
12. The solid-chemical composition of Claim 11, whereby said inorganic disintegrants are selected from one or more of the group consisting of bentonite, montmorillonite, kaolinite, and other clay minerals, and any combinations thereof.
13. The solid-chemical composition of Claim 1, which further includes a source of inorganic binders, fillers, and buffers from about 0.5% to 60% by weight of the composition.
14. The solid-chemical composition of Claim 13, whereby said inorganic binders, fillers, and buffers are selected from one or more of the group consisting of calcium carbonate, lime, limestone, siderite and ferrous carbonate, rhodochrosite and manganese carbonate, calcium phosphate, sodium bicarbonate, portland cement, metal oxides, metal hydroxides, metal oxyhydroxides and any combinations thereof.
15. The solid-chemical composition of Claim 1, which further includes a source of metal catalysts for chemical-oxidation reactions from about 0.25% to 25% by weight of the composition.

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16. The solid-chemical composition of Claim 15, whereby said metal catalysts are selected from one or more of the group consisting of soluble salts of ferrous iron, including ferrous sulfate; siderite and ferrous carbonate; and any combinations thereof.
 17. The solid-chemical composition of Claim 1, which further includes a source of lubricants and glidants for the preparation of the composition in the forms of tablets, granules, briquettes, pellets and like forms, from about 0.01% to 1.5% by weight of the composition.
 18. The solid-chemical composition of Claim 17, whereby said lubricants and glidants are selected from one or more of the group consisting of magnesium stearate, calcium stearate and other stearates, stearic acid, sodium stearyl fumarate, hydrogenated vegetable oil, silicone, talc, corn starch, and any combinations thereof.
 19. The solid-chemical composition of Claim 1, which further includes a source of dehydrated, dried and freeze-dried inoculum for biological organisms, microorganisms and fungi selected from one or more of the group consisting of inoculum for aerobic bacteria; facultative bacteria; other bacteria capable of using oxygen as a terminal electron acceptor for any biogeochemical process; denitrifying bacteria; mycoplasmas; white-rot fungi, brown-rot fungi and other multicellular fungi; yeasts; and any combinations thereof, from about 0.0001% to 0.5% by weight of the composition.
 20. The solid-chemical composition of Claim 19, whereby said inoculum for biological organisms, microorganisms and fungi are further selected from one or more of the group consisting of yellow boy, *Bacillus* spp., *Rhizobium* spp., *Bradyrhizobium* spp., *Fibrobacter* spp., *Clostridium* spp., *Pseudomonas* spp., *Geobacter* spp., *Arthrobacter* spp., *Nocardia* spp., *Aspergillus* spp., *Trichoderma* spp., *Candida* spp., *Yarrowia* spp., *Piptoporous* spp., *Serpula* spp., *Coriolus* spp., *Phanerochaete* spp., *Pleurotus* spp., *Sporotrichum* spp., *Bjerkandera* spp., and *Trametes* spp., and any combinations thereof.

21. A solid-chemical composition which provides both a sustained-release source of active oxygen and a source of complex inorganic phosphates, comprising:

- a. A solid-chemical source of active oxygen selected from one or more of the group consisting of calcium peroxide and magnesium peroxide, and any combinations thereof, from about 57% to 95% by weight of the composition;
- b. Sodium hexametaphosphate being a complex inorganic phosphate from about 0.25% to 25% by weight of the composition;
- c. Sodium trimetaphosphate being a complex inorganic phosphate from about 0.25% to 25% by weight of the composition;
- d. Pre-gelled starch being an organic disintegrant from about 0.1% to 4% by weight of the composition;
- e. Magnesium stearate being a lubricant and glidant from about 0.05% to 1% by weight of the composition.

22. The solid-chemical composition of Claim 21, further comprising another source of complex inorganic phosphates selected from the one or more of the group consisting of sodium tripolyphosphate, sodium-potassium tripolyphosphate tetrasodium polyphosphate, and any combinations thereof, from about 0.1% to 15% by weight of the composition.

23. The solid-chemical composition of Claim 21, further comprising a source of inorganic nitrogen from about 0.1% to 5% by weight of the composition.

24. The solid-chemical composition of Claim 23, whereby said source of inorganic nitrogen is ammonium free and selected from one or more of the group consisting of sodium nitrate, sodium-potassium nitrate, potassium nitrate, other soluble salts of nitrate and any combinations thereof.

25. The solid-chemical composition of Claim 21, further comprising a source of simple inorganic orthophosphates from about 0.1% to 20% by weight of said composition.

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26. The solid-chemical composition of Claim 25, whereby said simple inorganic orthophosphates are selected from one or more of the group consisting of sodium phosphate, calcium phosphate, potassium phosphate, sodium-potassium phosphate, and any combinations thereof.
27. The solid-chemical composition of Claim 21, further comprising another source of organic disintegrants, selected from one or more of the group consisting of powdered molasses, granulated sugar, sodium starch glycolate, crosscarmellose of sodium, crospovidone, and any combinations thereof from about 0.01% to 1% by weight of said composition.
28. The solid-chemical composition of Claim 21, which further includes a source of inorganic disintegrants from about 0.05% to 10% by weight of composition.
29. The solid-chemical composition of Claim 28, whereby said inorganic disintegrants are selected from one or more of the group consisting of bentonite, montmorillonite, kaolinite, and other clay minerals, and any combinations thereof.
30. The solid-chemical composition of Claim 1, which further includes a source of inorganic binders, fillers, and buffers from about 0.5% to 30% by weight of the composition.
31. The solid-chemical composition of Claim 30, whereby said inorganic binders, fillers, and buffers are selected from one or more of the group consisting of calcium carbonate, lime, limestone, siderite and ferrous carbonate, rhodochrosite and manganese carbonate, calcium phosphate, sodium bicarbonate, portland cement, metal oxides, metal hydroxides, metal oxyhydroxides and any combinations thereof.
32. The solid-chemical composition of Claim 21, which further includes a source of metal catalysts for chemical-oxidation reactions from about 0.25% to 15% by weight of the composition.

33. The solid-chemical composition of Claim 32, whereby said metal catalysts are selected from one or more of the group consisting of soluble salts of ferrous iron, including ferrous sulfate; siderite and ferrous carbonate; and any combinations thereof.
34. The solid-chemical composition of Claim 21, which further includes another source of lubricants and glidants selected from one or more of the group consisting of calcium stearate and other stearates, stearic acid, sodium stearyl fumarate, hydrogenated vegetable oil, silicone, talc, corn starch, and any combinations thereof, from about 0.01% to 1% by weight of the composition.
35. The solid-chemical composition of Claim 21, which further includes a source of dehydrated, dried and freeze-dried inoculum for biological organisms, microorganisms and fungi selected from one or more of the group consisting of inoculum for aerobic bacteria; facultative bacteria; other bacteria capable of using oxygen as a terminal electron acceptor for any biogeochemical process; denitrifying bacteria; mycoplasmas; white-rot fungi, brown-rot fungi and other multicellular fungi; yeasts; and any combinations thereof, from about 0.0001% to 0.5% by weight of the composition.
36. The solid-chemical composition of Claim 35, whereby said inoculum for biological organisms, microorganisms and fungi are further selected from one or more of the group consisting of yellow boy, *Bacillus* spp., *Rhizobium* spp., *Bradyrhizobium* spp., *Fibrobacter* spp., *Clostridium* spp., *Pseudomonas* spp., *Geobacter* spp., *Arthrobacter* spp., *Nocardia* spp., *Aspergillus* spp., *Trichoderma* spp., *Candida* spp., *Yarrowia* spp., *Piptoporous* spp., *Serpula* spp., *Coriolus* spp., *Phanerochaete* spp., *Pleurotus* spp., *Sporotrichum* spp., *Bjerkandera* spp., and *Trametes* spp., and any combinations thereof.
37. The solid-chemical composition of Claims 1 through 20, whereby said composition is prepared in the form of granules, briquettes, tablets, capsules, pellets, and any combinations thereof.

Sub-claim

38.

The solid-chemical composition of Claims 21 through 36, whereby said composition is prepared in the form of granules, briquettes, tablets, capsules, pellets, and any combinations thereof.

39.

A method for the non-exothermic chemical oxidation of organic and inorganic chemical contaminants in solid and liquid wastes, sludges, leachates, acid-mine drainages, waste waters, soils, sediments, ground waters, and surface waters, and any combinations thereof, whereby a solid-chemical source of active oxygen selected from one or more of the group consisting of calcium peroxide and magnesium peroxide, and any combinations thereof, is applied to said media.

40.

The method of Claim 39 whereby said solid-chemical source of active oxygen is applied in the form of granules, briquettes, tablets, capsules, pellets, and any combinations thereof.

41.

A method for both the non-exothermic chemical-oxidation and aerobic bioremediation of organic and inorganic chemical contaminants in solid and liquid wastes, sludges, leachates, acid-mine drainages, waste waters, soils, sediments, ground waters, and surface waters, and any combinations thereof, whereby a solid-chemical source of active oxygen selected from one or more of the group consisting of calcium peroxide and magnesium peroxide, and any combinations thereof, is applied to said media.

42.

The method of Claim 41 whereby said solid-chemical source of active oxygen is applied in the form of granules, briquettes, tablets, capsules, pellets, and any combinations thereof.

43. A method for the non-exothermic chemical-oxidation and aerobic bioremediation of organic and inorganic chemical contaminants in liquid and aqueous wastes, leachates, acid-mine drainages, waste waters, ground waters, and surface waters, and any combinations thereof, whereby a solid-chemical source of active oxygen in the form of granules, briquettes, tablets, capsules, pellets, and any combinations thereof, is used in such a manner whereas the intrinsic permeability of said granules, briquettes, tablets, capsules, pellets, and any combinations thereof, enhances the flow of said liquid wastes and media through said granules, briquettes, tablets, capsules, pellets, and any combinations thereof, to promote the treatment of said liquid wastes and media.
44. A method for the fungal biodegradation of recalcitrant organic contaminants in solid, industrial and hazardous wastes, sludges, wood and wood chips, saw dust, soils, and sediments, and any combinations thereof, whereby a solid-chemical source of active oxygen is applied to said media to promote the growth and enzymatic activity of white-rot fungi, brown-rot fungi and other aerobic fungi and yeast, and any combinations thereof.
45. The method of Claim 44 whereby said solid-chemical source of active oxygen is selected from one or more of the group consisting of calcium peroxide, magnesium peroxide, and any combinations thereof.
46. The method of Claim 44 whereby said solid-chemical source of active oxygen is applied in the form of granules, briquettes, tablets, capsules, pellets, and any combinations thereof.
47. The method of Claim 44 whereby said fungi and yeast are selected from one or more of the group comprising *Aspergillus* spp., *Trichoderma* spp., *Candida* spp., *Yarrowia* spp., *Piptoporous* spp., *Serpula* spp., *Coriolus* spp., *Phanerochaete* spp., *Pleurotus* spp., *Sporotrichum* spp., *Bjerkandera* spp., and *Trametes* spp., and any combinations thereof.